A5200-3-4

Insurance Injury Report
I88-1

Passenger Cars, Vans, Pickups, and Utility Vehicles 1986-1988 Models

HIGHWAY
LOSS
DATA
INSTITUTE

Permission to quote from or to reproduce material from this publication is granted when due acknowledgement is made.
Highway Loss Data Institute -- 1005 North Glebe Road -- Arlington, Virginia 22201
Research Report HLDI I88-1--September 1989--Copyright 1989/HLDI

The membership of the Highway Loss Data Institute Board of Directors and the Technical Resource Committee represents insurance companies that are supplying data to HLDI. Financial support for HLDI is provided through the Insurance Institute for Highway Safety, which in turn is supported by most automobile insurers either directly or through their trade associations.

Board of Directors

G.C. Klingman, Chairman
The Travelers Insurance Companies

M. Albaum
Prudential Property and Casualty Insurance Company

H.L. Cohen
Government Employees Insurance Company

J.B. Conners
Liberty Mutual Insurance Company

S.F. Goldberg
United Services Automobile Association

T.A. Hoyt
Nationwide Mutual Insurance Company

R.S. Lawson
Alliance of American Insurers

S.D. Marks
Aetna Life and Casualty

D.F. Snyder
American Insurance Association

W.W. Sorenson
State Farm Mutual Automobile Insurance Company

J.S. Trees
Allstate Insurance Company

T.E. Troxel
National Association of Independent Insurers

B. O'Neill, ex officio
Highway Loss Data Institute

Technical Resource Committee

M. Albaum, Chairman
Prudential Property and Casualty Insurance Company

H.L. Cohen
Government Employees Insurance Company

R.O. Elder
Highway Loss Data Institute

S.F. Goldberg
United Services Automobile Association

T.A. Hoyt
Nationwide Mutual Insurance Company

G.C. Klingman
The Travelers Insurance Companies

S.D. Marks
Aetna Life and Casualty

R.T. Muleski
Liberty Mutual Insurance Company

B. O'Neill
Highway Loss Data Institute

W.W. Sorenson
State Farm Mutual Automobile Insurance Company

J.S. Trees
Allstate Insurance Company

CONTENTS

Summary 1

Introduction 2

Results and Discussion 2

Passenger Cars 3
Vans, Pickups, and Utility Vehicles 12

Appendix A Specifications of Injury Coverages 17

Appendix B Method of Data Analysis 17

Appendix C Definitions 20

Appendix D Vehicle Series Designations

Part A: Passenger Cars 21
Part B: Vans, Pickups, and Utility Vehicles 27

HLDI Publications 31

Table 1 Personal Injury Protection Coverages -- Claim Frequencies by Model Year and Size of Claim 3

Table 2 1986-88 Passenger Cars With the Lowest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages 3

Table 3 1986-88 Passenger Cars With the Highest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages 4

Table 4 Relative Claim Frequency by Size of Claim -- Personal Injury Protection Coverages -- 1986-88 Passenger Cars 6

Table 5 1986-88 Vans, Pickups, and Utility Vehicles with the Lowest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages 13

Table 6 1986-88 Vans, Pickups, and Utility Vehicles with the Highest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages 13

Table 7 Relative Claim Frequency by Size of Claim -- Personal Injury Protection Coverages -- 1986-88 Vans, Pickups, and Utility Vehicles 14

Figure 1 1986-88 Model Year Vans, Pickups, and Utility Vehicles--Relative Claim Frequencies -- Personal Injury Protection Coverages 12

SUMMARY

This Highway Loss Data Institute (HLDI) report presents the frequency of claims for injuries to occupants of 1986, 1987, and 1988 model year passenger cars, vans, pickups, and utility vehicles. Results are shown separately for all injury claims and for those claims for which the medical losses exceeded $250, $500, and $1,000.

Principal Findings

Passenger Cars

- Of the 17 cars with the best results, 10 were large, 5 were midsize, and 2 were small vehicles. Seven of these were manufactured in the United States, nine in Europe and one in Japan.

- All of the 21 cars with the worst results were small cars. Both the two-door and four-door versions of the Chevrolet Sprint and Spectrum, Isuzu I-Mark, Nissan Sentra, and Hyundai Excel were among the cars with the worst results. Nineteen were imported models: 14 from Japan, 4 from Korea, and 1 from Yugoslavia.

- Among the cars with the best injury loss experience, the Mercedes SDL/SEL series (300SDL, 420SEL, 500 SEL, and 560SEL) had the lowest overall claim frequency (59 percent below average) and the lowest frequency of claims exceeding $250 (59 percent below average). The midsize Volvo 240 station wagon had the lowest frequency of claims greater than $500 (55 percent below average).

- Among the cars with the worst injury loss experience, the four-door Hyundai Excel had the highest overall injury claim frequency (89 percent above average) and the highest frequency of claims exceeding $250 (89 percent above average). The four-door Chevrolet Spectrum had the highest frequency of claims exceeding $500 (86 percent above average) and the highest frequency of claims greater than $1,000 (88 percent above average).

- As a group, small cars had the worst results and large cars had the best, but this size relationship does not hold for every vehicle series because of considerable variation within size groups. For example, among small four-door models, the overall claim frequency of the Hyundai Excel was approximately two and one-half times that for the Saab 900. The small two- and four-door Saab 900 models had better injury results than virtually all of the midsize cars of the same body style.

Vans, Pickups, and Utility Vehicles

- Among vans, pickups, and utility vehicles, large utility vehicles had the best injury experience; small utility vehicles and small pickups had the worst.

- The two standard size Ford F-250 Super Cab pickups and the Jeep Grand Wagoneer, an intermediate utility vehicle, had the lowest overall injury claim frequencies.

- The small size Toyota Standard Bed pickup and the Suzuki Samurai, a small utility vehicle, had the highest overall injury claim frequencies.

- Injury claim frequencies were closely related to vehicle size, with the larger vehicles having lower claim frequencies.

INTRODUCTION

The Highway Loss Data Institute (HLDI) is a nonprofit, public service organization that gathers, processes, and publishes insurance data concerned with human and economic losses associated with motor vehicle use, especially with the ways such losses vary among different kinds of vehicles.

This report compares the frequencies of claims for injuries to occupants of 1986 through 1988 model year passenger cars, vans, pickups, and utility vehicles. In addition to the frequencies of all claims, frequencies are given separately for claims with medical payments exceeding $250, $500, and $1,000. The results are given for individual vehicle series as well as for various groupings based on vehicle size and body style.

In calculating injury claim frequencies, all injuries in a crash-involved vehicle resulting in claims for medical expenses made under personal injury protection insurance coverages are counted as a single claim. The specifications of injury coverages, which principally insure against medical losses to occupants of the insured vehicles, are given in Appendix A. The data analysis methods used in the preparation of this report are detailed in Appendix B. Definitions are given in Appendix C, and Appendix D contains a complete list of the vehicles covered by this report. The data used were supplied by 11 insurers: Aetna, Allstate, Fireman's Fund, Kemper, Liberty Mutual, Nationwide, Prudential, Safeco, State Farm, Travelers, and USAA.

This report is based on injury coverages and injury claims involving 1986 through 1988 model year vehicles in the period from their introduction through December 1988. It does not include the results for vehicles discontinued prior to the 1988 model year.

Results and Discussion

This report presents injury claim frequency results for 1986 to 1988 model year vehicles. Results are presented in two sections: The first summarizes the results for passenger vehicles and the second for vans, pickups, and utility vehicles. The frequency of all injury claims and the frequencies of claims with medical payments exceeding $250, $500, and $1,000 are shown for those vehicles with sufficient exposure.* Each claim frequency result, whether for passenger cars, vans, pickups, or utility vehicles, is presented in relative terms, with 100 representing the claim frequency for all passenger cars combined in each claim size category.

The results shown in this report were standardized to reduce the effects due to differences in the mix of operator age group among different vehicles. Standardizing for this nonvehicle factor ensures that its mix is the same for each result. It should be noted that other nonvehicle factors could vary among different vehicles and that any effects resulting from such factors have not necessarily been accounted for in the results presented in this report. The standardization procedure is described in detail in Appendix B.

The relative injury claims experience of particular vehicles does not change substantially from model year to model year providing that the basic design of the vehicle remains essentially unchanged. HLDI has published the results of a statistical analysis *(HLDI Report A-26)* that demonstrated that the injury results of individual model year vehicles were generally consistent across model years when the basic vehicle designs remained the same. Because of the general consistency of injury results from model year to model year and because substantial amounts of exposure are needed to produce reliable injury claim frequency results, the data for model years 1986 through 1988 were combined for those vehicles with basic designs that remained unchanged. Vehicle series that were discontinued prior to 1988 (e.g., Plymouth Turismo and Mercury Lynx in 1987) are not included. Vehicle series that were redesigned (e.g., Pontiac Grand Prix, Buick Regal) or newly introduced (e.g., Dodge Dynasty, Buick Reatta) in 1988 are included. For each vehicle series and each vehicle subgroup, a separate relative claim frequency was calculated for each model year. The overall result for each vehicle series was then obtained by weighting these relative claim frequencies by the applicable exposure for each model year. (For additional explanation of this procedure, see Appendix B.)

Beginning with the 1987 model year, the federal government required automobile manufacturers to install automatic restraint systems for front seat occupants--either automatic seat belts or air bags--in 10 percent of their passenger cars. The percentage of vehicles covered by the regulation (49 CFR Sec. 571.208) increases for successive model years to 100 percent for 1990 model year cars.

Because automatic restraint systems are important design changes, the injury results for vehicle series during their transition from manual to automatic restraint systems were separately computed, and this report presents manual-only or automatic-only injury results for these vehicles, based on exposure considerations. All models equipped with automatic restraint systems that had adequate exposure are reported. The Dodge Diplomat, for example, although equiped with air bags in late 1988 had insufficient exposure for these models and consequently the results in this report are based on models with manual belt systems. Last year's report *(HLDI Report I87-1)* included 11 cars with automatic seat belt systems and four with driver-side air bags. This report reflects the increase in the availability of front-seat automatic restraint systems and includes results for 19 cars with nonmotorized automatic seat belt systems, 8 with motorized seat belt systems and four with driver-side air bags. All of these models are specifically identified in the detailed results that follow.

*The exposure thresholds for reporting results were 5,000 insured vehicle years for all claims; 10,000 years for claims greater than $250; 15,000 years for claims greater than $500; and 25,000 years for claims greater than $1,000.

Subsequent injury loss reports will cover the increasing number of vehicles equipped with automatic passenger restraint systems.

Passenger Cars

The total exposure accumulated by passenger vehicles of the three model years included in this report exceeded 7 million insured vehicle years. Table 1 presents the claim frequencies by claim size for each model year. Claim frequencies decreased rapidly with each successively larger medical cost group. The frequency of claims exceeding $250 was about 60 percent of the overall claim frequency, the frequency of claims exceeding $500 was less than 50 percent the overall frequency, and the frequency of claims greater than $1,000 was approximately 30 percent the overall frequency.

The total amount of money paid out, however, was dramatically influenced by the larger claims. For example, in 1988, claims exceeding $1,000, although representing only 31 percent of all claims, accounted for 86 percent of the total dollars for medical payments. Claims exceeding $500 accounted for 94 percent of the total dollars, and claims over $250 accounted for nearly 98 percent of the total dollars.

Injury results for cars identified in the following tables with special symbols are based on models equipped with automatic restraints. Cars identified with an * are equipped with air bags. Cars identified with a • are equipped with automatic shoulder belts that are moved by a motor along guide rails above the door; the belts position themselves around occupants when the

Table 1
Personal Injury Protection Coverages – Claim Frequencies by Model Year and Size of Claim

Model Year	Total Exposure (Insured Vehicle Years)	Claim Frequencies Per 1,000 Insured Vehicle Years			
		All Claims	>$250	>$500	>$1,000
1988	1,080,422	21.3	12.5	9.4	6.5
1987	2,494,477	20.3	12.4	9.4	6.7
1986	3,437,679	19.5	12.1	9.1	6.5

Table 2
1986-88 Passenger Cars With the Lowest Overall Injury Claim Frequencies – Personal Injury Protection Coverages

Make & Series	Exposure (Insured Vehicle Years)	Relative Claim Frequencies By Size of Claim			
		All	>$250	>$500	>$1,000
* Mercedes SDL/SEL Series	20,586	**41**	**41**	**46**	
Saab 9000	9,986	42			
* Mercedes 560SL Conv.	8,992	50			
Pontiac Safari Wagon	9,302	53			
Oldsmobile Custom Cruiser	13,958	54	**48**		
Jaguar XJ6	15,230	54	54	53	
BMW 500 Series	17,350	55	54	55	
* Mercedes 260E/300D/E	23,516	55	55	59	
Plymouth Grand Voyager	9,221	56			
Dodge Grand Caravan	9,311	57			
Ford Crown Victoria - S.W.	12,628	58	**48**		
Chevrolet Caprice - S.W.	26,413	58	50	52	56
Mercury Grand Marquis - S.W.	7,762	58			
Volvo 740/760 - S.W.	13,340	59	54		
• Toyota Camry - S.W.	11,024	59	57		
Volvo 240 - S.W.	19,595	60	50	**45**	
Porsche 944 Coupe	13,186	60	67		

Results listed in **bold type** highlight the lowest injury claim frequencies (i.e., results that are more than 50 percent lower than the corresponding all-car result). Blanks indicate insufficient exposure.
* Models equipped with air bags.
• Models equipped with motorized belt systems.

door is closed and ignition turned on. Cars identified with a ♦ are equipped with automatic belts that are not motorized; they are attached to the door and wrap around occupants when the car door is closed. Current models of these cars also have automatic restraints, although some manufactures have replaced automatic seat belts with air bags. Additional 1989 models and all 1990 models will be equipped with air bags or automatic seat belts.

Table 2 summarizes the individual vehicle series with the lowest overall injury claim frequencies listed in increasing order of their overall relative claim frequency. The table includes all vehicle series with at least one claim frequency result that is less than half the all-car result, i.e., a relative claim frequency of 49 or less for any of the four claim-size categories. Claim frequency values of less than half of the all-car average are listed in bold print.

Of the 17 vehicles listed in Table 2, 10 are large vehicles (of which 7 are station wagons or passenger vans), 5 are midsize, and 2 are small vehicles. Seven of these vehicle series were manufactured in the United States, nine were made in Europe, and one in Japan.

The Mercedes-Benz SDL/SEL series, which includes the 300SDL, 420SEL, 500SEL, and 560SEL, had the lowest overall relative claim frequency (41) and the lowest relative frequency (41) of claims exceeding $250. The midsize Volvo 240 station wagon had the lowest relative frequency (45) of claims over $500.

Table 3 summarizes the individual vehicle series with the highest overall injury claim frequencies listed in decreasing order of their overall relative claim frequency. This table includes all vehicle series with at least one claim frequency result that is more than 50 percent higher than the all-car result, i.e., a relative claim frequency of 151 or more for any of the four claim-size categories. Claim frequency values that exceed the all-car average by more than 50 percent are shown in bold print.

All of the 21 vehicles listed in Table 3 are small cars. Both the two-door and four-door versions of the Chevrolet Sprint, Isuzu I-Mark, Nissan Sentra, Chevrolet Spectrum, and Hyundai Excel were among the cars with the worst injury losses. Nineteen of the 21 vehicles with the worst results in Table 3 are imported models: 14 from Japan, 4 from Korea, and 1 from Yugoslavia.

Table 3

1986-88 Passenger Cars With the Highest Overall Injury Claim Frequencies – Personal Injury Protection Coverages

Make & Series	Exposure (Insured Vehicle Years)	Relative Claim Frequencies By Size of Claim			
		All	>$250	>$500	>$1,000
♦Hyundai Excel - 4 Dr.	13,843	189	190		
Isuzu I-Mark - 2 Dr.	5,519	182			
Chevrolet Sprint - 2 Dr.	24,467	178	180	182	
Chevrolet Spectrum - 4 Dr.	45,441	176	185	186	188
• Ford Escort - 2 Dr.	5,811	167			
Chevrolet Spectrum - 2 Dr.	20,564	166	165	158	
Isuzu I-Mark - 4 Dr.	13,159	164	180		
Chevrolet Sprint - 4 Dr.	19,097	164	169	174	
Yugo	26,714	162	171	172	176
Mitsubishi Mirage	8,206	162			
Mitsubishi Cordia	6,009	162			
Hyundai Excel - 2 Dr.	41,745	157	165	169	168
Ford EXP	20,986	155	163	166	
Mitsubishi Tredia	9,475	154			
Nissan Sentra - 4 Dr.	39,181	153	156	158	162
Pontiac Lemans - 2 Dr.	5,262	153			
Plymouth Colt - 4 Dr.	18,078	152	150	155	
Nissan Sentra - 2 Dr.	89,718	151	153	153	150
Ford Festiva	9,417	147			
Nissan Pulsar	20,804	145	158	158	
Dodge Colt - 4 Dr.	22,814	143	147	152	

Results listed in **bold type** highlight the highest injury claim frequencies (i.e., results that are more than 50 percent higher than the corresponding all-car result). Blanks indicate insufficient exposure.

• Models equipped with motorized belt systems.

♦ Models equipped with nonmotorized belt systems.

The four-door Hyundai Excel with automatic seat belts as standard equipment had the highest overall relative claim frequency (189) and the highest relative frequency (190) of claims exceeding $250. The four-door Chevrolet Spectrum had the highest relative frequency (186) of claims greater than $500 and the highest relative claim frequency (188) of claims over $1,000.

Table 4 presents relative injury claim frequency results for all of the 1986 through 1988 models with sufficient exposure. Results are shown for individual series and for each car size and body style group. The individual series results in Table 4 are listed within each group in ascending sequence of their overall relative claim frequencies.

The results in Table 4 indicate that, as a group, cars with smaller wheelbases had higher injury losses than cars with larger wheelbases. For example, large four-door models had relative claim frequencies of 71 or less for the four claim-size categories, whereas small four-door models had relative claim frequencies of 134 or more. However, this size relationship does not hold for every vehicle series because of considerable variation within size groups. The Mercedes-Benz 560SL and Porsche 944 Coupe have particularly good injury results, even though they are small cars. The small size Saab 900 (two- and four-door models) had better injury results than most of the midsize cars of the same body style.

Table 4 also shows that there were large differences in the loss experiences of cars within the same car size and body style categories. For example, the highest relative claim frequency for small four-door models of 189 for the Hyundai Excel was nearly two and one-half times the lowest result of 77 for the Saab 900. For small two-door models, the high of 182 for the Isuzu I-Mark was more than double the low of 83 for the Saab 900.

(Text continues on page 12.)

Table 4
Relative Claim Frequency by Size of Claim
Personal Injury Protection Coverages – 1986-1988 Passenger Cars

Model Years	Make	Series	Exposure	Size of Claim All	>$250	>$500	>$1,000
86-88	**All**	**All**	**7,012,578**	**100**	**100**	**100**	**100**
			SMALL CARS				
Two-Door Models			**682,973**	**134**	**135**	**134**	**135**
86-88	Saab	900	19,891	83	79	74	
86-88	Volkswagen	GTI	12,471	95	95		
86-88	Volkswagen	Golf	12,341	96	90		
88	Honda	Civic	7,249	97			
86-88	Acura	Integra	20,912	102	98	94	
86-88	Mazda	323	19,075	106	107	110	
88	Mazda	MX-6	5,698	112			
87-88	• Plymouth	Conquest	5,160	119			
87-88	Plymouth	Sundance	14,315	121	111		
86-88	Nissan	200SX	33,527	121	126	131	135
87-88	Volkswagen	Fox	5,357	122			
86-88	Toyota	Celica	84,347	123	126	122	120
87-88	Toyota	Corolla FX	12,481	124	127		
87-88	Dodge	Shadow	14,473	126	115		
86-88	Plymouth	Colt	19,132	129	122	129	
86-88	Subaru	Hatchback	8,676	129			
86-88	Dodge	Colt	24,666	130	123	119	
86-88	Volkswagen	Scirocco	7,117	131			
87-88	Toyota	Tercel	31,580	132	130	122	127
86-88	Subaru	DL/GL	6,106	133			
87-88	♦ Dodge	Daytona	12,770	133	129		
87-88	Nissan	Pulsar	20,804	145	158	158	
88	Ford	Festiva	9,417	147			
87-88	Nissan	Sentra	89,718	151	153	153	150
88	Pontiac	Lemans	5,262	153			
86-88	Hyundai	Excel	41,745	157	165	169	168
86-88	Yugo		26,714	162	171	172	176
86-88	Mitsubishi	Cordia	6,009	162			
86-88	Mitsubishi	Mirage	8,206	162			
86-88	Chevrolet	Spectrum	20,564	166	165	158	
88	• Ford	Escort	5,811	167			
86-88	Chevrolet	Sprint	24,467	178	180	182	
86-88	Isuzu	I-Mark	5,519	182			
Four-Door Models			**832,457**	**134**	**136**	**136**	**137**
86-88	Saab	900	13,448	77	71		

Table 4 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim All	>$250	>$500	>$1,000
		SMALL CARS (Cont'd)					
86-88	Volkswagen	Golf	20,517	100	101	102	
86-88	Acura	Integra	13,555	102	99		
88	Honda	Civic	13,409	111	110		
87-88	Dodge	Shadow	14,662	112	110		
87-88	Plymouth	Sundance	16,297	112	109	106	
86-88	Subaru	GL 4WD	9,782	114			
88	Toyota	Corolla	12,054	115	122		
86-88	Chevrolet	Nova	119,466	119	117	115	112
86-88	Mazda	323	44,003	119	124	120	119
86-88	Dodge	Omni	62,070	120	117	114	115
86-88	Plymouth	Horizon	76,047	121	113	110	107
87-88	Volkswagen	Fox	6,976	124			
87-88	♦ Volkswagen	Jetta GL	6,846	129			
86-88	Subaru	DL/GL	32,420	139	148	148	144
86-88	Dodge	Colt	22,814	143	147	152	
86-88	Plymouth	Colt	18,078	152	150	155	
87-88	Nissan	Sentra	39,181	153	156	158	162
86-88	Mitsubishi	Tredia	9,475	154			
86-88	Isuzu	I-Mark	13,159	164	180		
86-88	Chevrolet	Sprint	19,097	164	169	174	
86-88	Chevrolet	Spectrum	45,441	176	185	186	188
87-88	♦ Hyundai	Excel	13,843	189	190		
Station Wagons/Passenger Vans			**147,221**	**88**	**84**	**81**	**80**
86-88	Subaru	DL/GL 4WD	42,480	80	73	71	75
86-88	Toyota	Van	13,360	84	82		
86-88	Nissan	Stanza	22,976	89	92	88	
86-88	Toyota	Tercel 4WD	8,827	98			
86-88	Subaru	DL/GL	24,677	100	93	88	
87-88	Nissan	Sentra	7,207	102			
Sports & Specialty			**262,153**	**102**	**107**	**110**	**109**
86-88	* Mercedes	560SL	8,992	50			
86-88	Porsche	944 Coupe	13,186	60	67		
86-88	Chevrolet	Corvette Conv.	5,687	76			
86-88	Chevrolet	Corvette	20,454	87	98	112	
86-88	Mazda	RX-7	44,980	91	90	94	98
86-88	Nissan	300ZX 2+2	10,997	92	101		
86-88	Nissan	300ZX	30,538	96	104	103	99
86-88	Volkswagen	Cabriolet	9,717	111			
86-88	Pontiac	Fiero	48,844	127	130	129	126
86-88	Toyota	MR2	21,005	132	142	148	
88	Honda	Civic CRX	5,548	141			
86-88	Ford	EXP	20,986	155	163	166	

Table 4 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim			
				All	>$250	>$500	>$1,000
			MIDSIZE CARS				
Two-Door Models			**822,254**	**107**	**107**	**107**	**105**
88	♦ Oldsmobile	Cutlass FWD	5,333	79			
88	♦ Buick	Regal	10,947	84	76		
86-88	Oldsmobile	Cutlass RWD	97,315	85	88	86	86
88	♦ Pontiac	Grand Prix	6,422	90			
88	♦ Honda	Prelude	11,911	91	89		
87-88	♦ Honda	Accord	20,748	91	84	80	
86-88	Merkur	XR4Ti	6,508	92			
86-88	Buick	Century	7,447	93			
86-88	Oldsmobile	Cutlass Ciera	29,124	96	93	92	90
86-88	Ford	Thunderbird	113,886	98	104	105	105
86-88	Chevrolet	Monte Carlo	78,298	98	98	97	96
86-88	Chevrolet	Celebrity	17,043	100	96	98	
86-88	Plymouth	Reliant	11,836	102	99		
86-88	Dodge	Aries	9,970	104			
86-88	Mercury	Cougar	102,912	105	108	110	111
87-88	♦ Chrysler	LeBaron	20,747	107	104	112	
87-88	♦ Oldsmobile	Calais	15,233	110	121	126	
87-88	♦ Buick	Somerset/Skylark	5,590	119			
87-88	♦ Pontiac	Grand Am	36,298	120	121	124	119
86-88	Buick	Skyhawk	32,352	129	121	121	121
88	♦ Chevrolet	Beretta	6,854	133			
86-88	Pontiac	Sunbird	43,728	135	128	122	116
86-88	Chevrolet	Cavalier	116,830	136	136	133	125
86-88	Oldsmobile	Firenza	9,404	137			
Four-Door Models			**1,810,746**	**95**	**94**	**94**	**94**
88	Chrysler	New Yorker (C Body)	5,893	67			
86-88	Chrysler	New Yorker (E Body)	41,161	84	88	92	90
87-88	• Toyota	Camry	69,041	84	85	85	88
86-88	Mercury	Sable	51,476	85	84	87	81
86-88	Ford	Taurus	136,323	86	87	89	90
86-88	Chrysler	LeBaron GTS	45,365	86	83	80	77
86-88	• Toyota	Cressida	30,708	89	101	108	115
86-88	Honda	Accord	245,446	89	88	88	88
86-88	Oldsmobile	Cutlass Ciera	185,780	89	87	86	86
86-88	Chrysler	LeBaron	37,329	90	93	96	93
86-88	Volvo	240	33,799	90	90	96	100
86-88	Buick	Century	136,793	90	87	89	90
86-88	Plymouth	Caravelle	21,453	90	81	81	
86-88	Dodge	600	19,070	93	95	94	
86-88	Pontiac	6000	93,704	94	91	90	90
86-88	Chevrolet	Celebrity	157,612	95	92	90	89
86-88	Dodge	Lancer	29,659	95	91	91	93
87-88	• Mazda	626	13,599	95	84		

Table 4 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim			
				All	>$250	>$500	>$1,000
			MIDSIZE CARS (Cont'd)				
86-88	Peugeot	505	6,313	96			
86-88	Cadillac	Cimarron	17,219	97	96	98	
86-88	Dodge	Aries	44,230	100	97	95	90
86-88	Mitsubishi	Galant	15,306	104	110	112	
86-88	Volkswagen	Quantum	5,771	105			
87-88	♦ Oldsmobile	Calais	9,004	105			
87-88	• Nissan	Maxima	33,710	106	113	113	120
88	• Ford	Tempo	14,452	106	112		
86-88	Plymouth	Reliant	50,862	110	104	101	98
86-88	Pontiac	Sunbird	26,456	111	108	105	98
87-88	Chevrolet	Corsica	33,030	111	109	108	111
87-88	♦ Pontiac	Grand Am	14,456	114	109		
87-88	Nissan	Stanza	32,567	115	114	116	115
86-88	Buick	Skyhawk	15,555	120	116	113	
86-88	Oldsmobile	Firenza	9,787	122			
86-88	Chevrolet	Cavalier	98,543	129	127	124	122
Station Wagons/Passenger Vans			**332,541**	**81**	**75**	**74**	**74**
87-88	• Toyota	Camry	11,024	59	57		
86-88	Volvo	240	19,595	60	50	45	
86-88	Ford	Taurus	56,538	67	63	63	62
86-88	Mercury	Sable	18,676	67	66	66	
86-88	Oldsmobile	Cutlass Ciera	23,339	70	64	64	
86-88	Buick	Century	16,540	71	63	64	
86-88	Pontiac	6000	11,137	71	61		
86-88	Chrysler	LeBaron	5,118	78			
86-88	Dodge	Colt Vista 4WD	5,209	82			
86-88	Chevrolet	Celebrity	48,348	84	80	80	78
86-88	Plymouth	Reliant	21,559	92	87	82	
86-88	Chevrolet	Cavalier	34,708	106	99	95	107
86-88	Plymouth	Colt Vista	8,900	106			
86-88	Dodge	Aries	18,633	108	92	91	
86-88	Dodge	Colt Vista	10,848	110	109		
Sports & Specialty			**708,242**	**103**	**104**	**105**	**106**
86-88	Saab	9000	9,986	42			
86-88	BMW	500 Series	17,350	55	54	55	
86-88	Volvo	740/760 SW	13,340	59	54		
86-88	Cadillac	Seville	11,368	61	63		
86-88	Acura	Legend 4D	25,123	62	62	63	59
86-88	Lincoln	Mark VII	20,115	65	69	76	
86-88	Oldsmobile	Toronado	9,688	68			
86-88	Cadillac	Eldorado	15,684	71	72	74	
86-88	Audi	5000	30,204	79	83	88	91

Table 4 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim All	>$250	>$500	>$1,000
			MIDSIZE CARS (Cont'd)				
86-88	Volvo	740/760 4D	35,196	80	82	81	85
86-88	Toyota	Supra	22,173	84	84	84	
86-88	* Mercedes	190D/E	17,539	87	83	86	
86-88	Buick	Riviera	10,855	89	89		
86-88	BMW	300 Series 2D	26,651	91	96	103	106
86-88	BMW	300 Series 4D	17,827	91	92	93	
86-88	Chrysler	LeBaron Conv.	14,198	93	90		
86-88	Ford	Mustang Conv.	18,908	102	107	114	
86-88	Pontiac	Firebird	80,925	122	124	128	130
86-88	Ford	Mustang	145,796	131	132	130	131
86-88	Chevrolet	Camaro	126,174	133	137	140	137
			LARGE CARS				
Two-Door Models			**14,558**	**80**	**76**		
86-88	Chevrolet	Caprice	5,111	67			
87-88	♦ Buick	LeSabre	5,312	92			
Four-Door Models			**563,786**	**67**	**69**	**70**	**71**
86-88	Ford	Crown Victoria	58,165	63	60	59	59
87-88	♦ Pontiac	Bonneville	24,166	63	57	58	
86-88	Mercury	Grand Marquis	90,627	64	67	67	66
86-88	Chevrolet	Caprice	101,173	64	64	66	65
86-88	Buick	Electra	67,428	67	67	70	73
86-88	Dodge	Diplomat	12,753	68	70		
87-88	♦ Buick	LeSabre	25,676	68	69	71	68
86-88	Plymouth	Gran Fury	7,403	69			
86-88	Oldsmobile	Ninety-Eight	70,725	71	74	74	73
86-88	Chrysler	New Yorker 5th Ave	69,742	72	75	82	86
87-88	♦ Oldsmobile	Delta 88	35,709	79	83	83	86
Station Wagons/Passenger Vans			**501,404**	**63**	**60**	**60**	**59**
86-88	Pontiac	Safari Wagon	9,302	53			
86-88	Oldsmobile	Custom Cruiser	13,958	54	48		
88	Plymouth	Grand Voyager	9,221	56			
88	Dodge	Grand Caravan	9,311	57			
86-88	Chevrolet	Caprice	26,413	58	50	52	56
86-88	Ford	Crown Victoria	12,628	58	48		
86-88	Mercury	Grand Marquis	7,762	58			
86-88	Dodge	Caravan	101,108	62	61	60	57
86-88	Plymouth	Voyager	103,210	63	56	57	55
86-88	Buick	Electra	6,242	63			
86-88	Chevrolet	Astro Van	71,873	65	63	63	63

Table 4 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim All	>$250	>$500	>$1,000
			LARGE CARS (Cont'd)				
86-88	GMC	Safari Van	15,702	68	63	60	
86-88	Ford	Aerostar	108,482	70	69	70	70
Sports & Specialty			**334,244**	**65**	**69**	**72**	**74**
86-88	* Mercedes	SDL/SEL Series	20,586	41	41	46	
86-88	Jaguar	XJ6	15,230	54	54	53	
86-88	* Mercedes	260E/300D/E	23,516	55	55	59	
86-88	Lincoln	Town Car	95,112	67	74	77	78
86-88	Cadillac	Brougham	41,889	67	72	78	79
86-88	Cadillac	Fleetwood/DeVille 4D	101,909	69	72	76	79
86-88	Cadillac	DeVille 2D	30,940	85	86	89	98

Injury results for cars identified with special symbols are based on models equipped with automatic restraints (* for air bags, • for motorized belt systems, ♦ for nonmotorized belt systems). Current models of these cars also have automatic restraints, although some have replaced automatic seat belts with air bags. Additional 1989 models -- and all 1990 models -- will be equipped with air bags or automatic safety belts.

Results are standardized to the distribution:

Youthful Operator	No Youthful Operator
10%	90%

Minimum exposure requirements for reporting:

All Claims	--	5,000 Vehicle Years
Claims >$250	--	10,000 Vehicle Years
Claims > $500	--	15,000 Vehicle Years
Claims >$1000	--	25,000 Vehicle Years

Exposure and claims data collected through December 1988.
Blanks indicate insufficient exposure.

Vans, Pickups, and Utility Vehicles

This section presents injury claim frequency results for 1986 through 1988 model year vans, pickups, and utility vehicles. The results for pickups are presented for small and standard pickups. Small pickups are defined as those with curb weight of less than 3,500 pounds. The utility vehicle results are divided into three wheelbase size groups: Small utility vehicles are those with wheelbases less than 100 inches; intermediate utility vehicles are those with wheelbases in the range 100 to 120 inches; and large utility vehicles are those with wheelbases exceeding 120 inches.

The results for vans, pickups, and utility vehicles are presented in relative terms with the value 100 corresponding to the result for *all passenger cars* combined in each claim size category. Thus, the value 63 for the overall relative claim frequency of all 1986 through 1988 model year vans indicates a claim frequency result that was 37 percent better than the result for all 1986 through 1988 model year passenger cars.

The total exposure for vans, pickups, and utility vehicles represented in the three model years included in this report was approximately 2.2 million insured vehicle years. Figure 1 displays the results by size of claim for each of the six vehicle groups. For pickups and utility vehicles, there was a strong relationship between vehicle size and injury claim frequencies; the larger vehicles tended to have lower claim frequencies. As a group, the best claim frequency results were for large utility vehicles. (The Chevrolet Suburban and GMC Suburban models account for all of the exposure for this vehicle group.) Small pickups and small utility vehicles had the highest claim frequency results.

Table 5 summarizes the individual vans, pickups, and utility vehicles with the lowest injury claim frequencies listed in increasing order of their overall relative claim frequency. It contains four utility vehicles, two standard-size pickups, and one van. The two Ford F-250 Super Cab pickups and the Jeep Grand Wagoneer, an intermediate utility vehicle, had overall injury claim frequencies that were less than 40 percent of the all-car frequency.

Figure 1
1986-88 Model Year Vans, Pickups, and Utility Vehicles
Relative Claim Frequencies--Personal Injury Protection Coverages

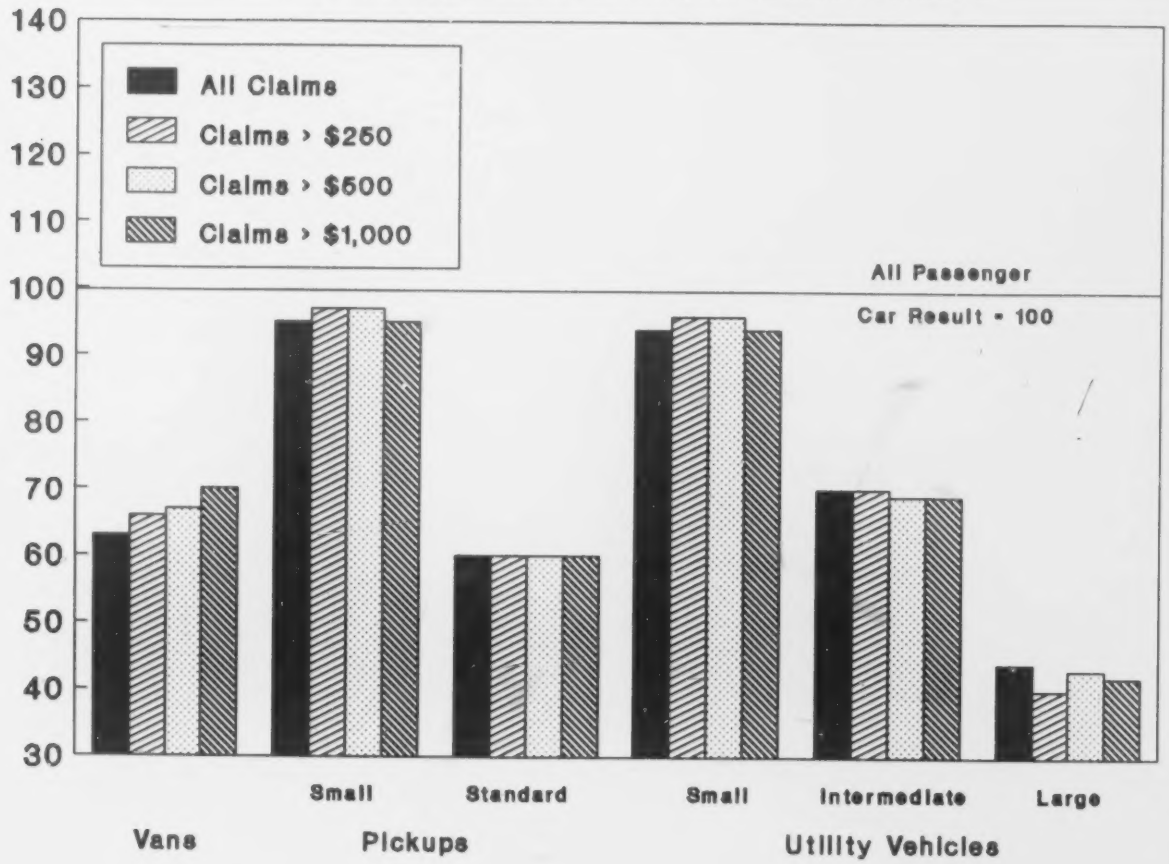

Table 6 lists the vans, pickups, and utility vehicles with the highest injury claim frequencies. All of the listed vehicles--five small pickups, two small utility vehicles, and one van--are Japanese imports. Topping the list were the Toyota Standard Bed pickup and the Suzuki Samurai, a small utility vehicle, both of which had injury claim frequencies that exceeded the all-car results by at least 20 percent in all claim size categories.

Table 7 presents relative injury claim frequency results for all of the 1986 through 1988 model year vans, pickups, and utility vehicles with sufficient exposure. Results are shown for individual series and for each vehicle group. Within each vehicle group, the individual series are listed in ascending sequence of their overall relative claim frequencies.

Table 5
1986-88 Vans, Pickups, and Utility Vehicles With the Lowest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages

Make and Series	Exposure (Insured Vehicle Years)	Relative Claim Frequencies By Size of Claim			
		All	>$250	>$500	>$1,000
Ford F-250 Super Cab 4x4	7,682	33			
Jeep Grand Wagoneer	11,534	37	35		
Ford F-250 Super Cab	10,199	38	38		
GMC Suburban (1/2T)	7,605	42			
Dodge B250 (3/4T)	7,250	43			
Chevrolet Suburban (1/2T) 4x4	10,417	44	35		
Chevrolet Suburban (1/2T)	26,521	44	41	43	44

Table 6
1986-88 Vans, Pickups, and Utility Vehicles With the Highest Overall Injury Claim Frequencies -- Personal Injury Protection Coverages

Make and Series	Exposure (Insured Vehicle Years)	Relative Claim Frequencies By Size of Claim			
		All	>$250	>$500	>$1,000
Toyota Standard Bed	60,684	124	134	139	140
Suzuki Samurai	34,082	121	128	129	127
Suzuki Samurai Van	7,818	120			
Mitsubishi Standard Bed	19,271	112	119	125	
Isuzu Standard Bed	26,199	111	118	118	113
Toyota Standard Bed 4x4	42,019	110	112	111	111
Toyota Long Bed (1/2T)	13,640	108	109		
Toyota Cargo Van	16,625	107	114	123	

Table 7

Relative Claim Frequency by Size of Claim
Personal Injury Protection Coverages --
1986-88 Vans, Pickups, and Utility Vehicles

Model Years	Make	Series	Exposure	Size of Claim			
				All	>$250	>$500	>$1,000
			VANS				
All Vans			**276,881**	**63**	**66**	**67**	**70**
86-88	Dodge	B250 (3/4T)	7,250	43			
86-88	Ford	E-150 Econoline (1/2-3/4T)	64,954	51	54	55	58
86-88	GMC	Vandura (3/4T)	12,023	52	57		
86-88	Ford	E-150 Club Wagon (1/2-3/4T)	8,037	53			
86-88	Dodge	B250 Cargo Van	26,401	55	57	61	58
86-88	Chevrolet	Chevy Van (3/4T)	45,287	56	56	57	59
86-88	Chevrolet	Sportvan (3/4T)	6,746	58			
86-88	Chevrolet	Chevy Van (1/2T)	8,399	58			
86-88	Ford	E-250 Econoline (3/4T)	5,767	59			
86-88	GMC	Safari Cargo Van	5,342	62			
86-88	Dodge	B150 (1/2T)	6,874	62			
86-88	Dodge	Mini Ram/Royal Van	5,253	66			
86-88	Dodge	B150 Cargo Van	10,530	75	79		
86-88	Chevrolet	Astro Cargo Van	26,355	82	87	87	90
86-88	Ford	Aerostar Cargo Van	13,638	88	102		
86-88	Toyota	Cargo Van	16,625	107	114	123	
			PICKUPS				
Small Pickups			**906,201**	**95**	**97**	**97**	**95**
86-88	Jeep	Comanche Long Bed 4x4	9,222	63			
87-88	Jeep	Comanche	7,890	71			
86-88	Dodge	D150 (1/2T)	38,453	72	70	75	70
86-88	Chevrolet	T10 4x4	20,472	72	63	58	
87-88	Dodge	Dakota (1/2T)	29,577	75	74	70	69
86-88	Ford	Ranger Super Cab	36,696	77	79	80	79
86-88	Ford	Ranger Super Cab 4x4	18,991	77	72	68	
86-88	Nissan	King Cab 4x4	13,438	79	81		
86-88	Jeep	Comanche Long Bed	8,957	80			
87-88	Dodge	Ram50 Long Bed	5,223	81			
86-88	Mazda	Long Bed	20,724	83	79	82	
86-88	Mazda	Cab Plus	27,401	83	78	79	77
86-88	Dodge	Ram50 4x4	8,122	86			
86-88	Ford	Ranger 4x4	27,995	87	85	80	77
86-88	Toyota	Long Bed (1/2T) 4x4	5,600	92			
86-88	Toyota	Xtra Cab 4x4	18,882	94	95	95	
86-88	Toyota	Xtra Cab Long Bed	12,079	95	100		

Table 7 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim			
				All	>$250	>$500	>$1,000
			PICKUPS (Cont'd)				
86-88	Nissan	King Cab	17,841	95	104	105	
86-88	Mazda	Standard Bed	68,849	96	102	100	96
86-88	Ford	Ranger	106,414	96	101	100	99
86-88	GMC	S15	17,640	97	97	96	
86-88	Chevrolet	S10	84,620	97	100	97	91
86-88	Nissan	Standard Bed 4x4	7,844	101			
86-88	Dodge	Ram50	32,847	102	101	100	100
86-88	Nissan	Standard Bed	58,373	104	105	109	107
86-88	Toyota	Long Bed (1/2T)	13,640	108	109		
86-88	Toyota	Standard Bed 4x4	42,019	110	112	111	111
86-88	Isuzu	Standard Bed	26,199	111	118	118	113
86-88	Mitsubishi	Standard Bed	19,271	112	119	125	
86-88	Toyota	Standard Bed	60,684	124	134	139	140
Standard Pickups			**385,731**	**60**	**60**	**60**	**60**
86-88	Ford	F-250 Super Cab 4x4	7,682	33			
86-88	Ford	F-250 Super Cab	10,199	38	38		
88	Chevrolet	10 Series (1/2T) 4x4	9,339	47			
86-88	Ford	F-250 (3/4T)	18,574	48	51	52	
86-88	Ford	F-150 Super Cab	32,659	48	52	54	54
86-88	Ford	F-250 (3/4T) 4x4	24,380	52	50	51	
86-88	Ford	F-150 (1/2-3/4T) 4x4	52,963	54	52	47	48
88	GMC	1500 Series (1/2T)	6,594	62			
86-88	Ford	F-150 (1/2-3/4T)	129,287	63	66	68	66
88	Chevrolet	10 Series (1/2T)	24,735	65	70	72	
86-88	Dodge	W150 (1/2T) 4x4	12,230	71	65		
87-88	Dodge	Dakota (1/2T) 4x4	8,702	75			
86-88	Toyota	4Runner	18,414	101	102	105	
			UTILITY VEHICLES				
Small Utility Vehicles			**170,031**	**94**	**96**	**96**	**94**
86-88	Mitsubishi	Montero 4x4	6,816	76			
87-88	Dodge	Raider	7,261	82			
86-88	Ford	Bronco II 4x4	81,729	84	80	79	77
87-88	Jeep	Wrangler	18,451	88	91	92	
86-88	Ford	Bronco II	13,874	97	103		
86-88	Suzuki	Samurai Van	7,818	120			
86-88	Suzuki	Samurai	34,082	121	128	129	127

Table 7 (Cont'd)

Model Years	Make	Series	Exposure	Size of Claim All	>$250	>$500	>$1,000
		UTILITY VEHICLES (cont'd)					
Intermediate Utility Vehicles			**415,305**	**70**	**70**	**69**	**69**
86-88	Jeep	Grand Wagoneer	11,534	37	35		
86-88	Dodge	Ramcharger	8,753	49			
86-88	Ford	Bronco	39,268	53	52	57	57
86-88	Jeep	Wagoneer	10,351	55	55		
86-88	Jeep	Cherokee	16,932	59	68	66	
86-88	Chevrolet	K10 Blazer (1/2T)	25,011	61	60	62	63
86-88	Jeep	Cherokee 4x4	85,009	63	59	57	57
86-88	GMC	Jimmy (1/2T)	5,467	64			
86-88	Isuzu	Trooper II 4x4	38,013	68	70	65	62
86-88	Dodge	Ramcharger 4x4	8,655	75			
86-88	GMC	T15 Jimmy 4x4	16,853	77	75	70	
86-88	Toyota	4Runner Wagon	5,940	80			
87-88	Nissan	Pathfinder	12,234	81	77		
86-88	Chevrolet	T10 Blazer 4x4	75,880	83	79	76	75
86-88	Chevrolet	S10 Blazer	42,064	92	105	108	108
86-88	GMC	S15 Jimmy	9,940	105			
Large Utility Vehicles			**57,298**	**44**	**40**	**43**	**42**
86-88	GMC	Suburban (1/2T)	7,605	42			
86-88	Chevrolet	Suburban (1/2T)	26,521	44	41	43	44
86-88	Chevrolet	Suburban (1/2T) 4x4	10,417	44	35		

Results are standardized to the distribution:

Youthful Operator	No Youthful Operator
10%	90%

Minimum exposure requirements for reporting:

All Claims	--	5,000 Vehicle Years
Claims >$250	--	10,000 Vehicle Years
Claims > $500	--	15,000 Vehicle Years
Claims >$1000	--	25,000 Vehicle Years

Exposure and claims data collected through December 1988.
Blanks indicate insufficient exposure

APPENDIX A
Specifications of Injury Coverages

Personal Injury Protection (PIP) Coverages

Personal injury protection coverages provide first-party insurance against medical and other types of losses in "no-fault" states.

The personal injury protection coverages reported in this study were based on data from the 19 states and the District of Columbia listed below.

Personal Injury Protection (PIP) Coverages States:

Colorado	Michigan
Connecticut	Minnesota
Delaware	New Jersey
District of Columbia	New York
Florida	North Dakota
Georgia	Oregon
Hawaii	Pennsylvania
Kansas	South Carolina
Kentucky	Texas
Maryland	Utah

APPENDIX B
Method of Data Analysis

Personal Injury Protection Coverages

Results in this report are based on personal injury protection (PIP) coverages that are provided in so-called no-fault states. These coverages were selected because they provide medical expense reimbursement to injured occupants of the insured vehicle.

Use of PIP insurance data to identify crashes involving injury has certain limitations because these data cannot provide information on all occupant injuries. This occurs when claims for injury costs are not made under PIP coverages because of the availability of other sources of medical expense reimbursements, such as bodily injury liability and/or health insurance coverages. Consequently, PIP claim frequencies do not include all of the crashes involving injury. This limitation should not distort comparisons among different vehicles.

Vehicle Description and Identification

The Vehicle Identification Numbers (VINs) of most new automobiles sold in the United States are individually unique numbers that contain, in coded form, detailed information as to each vehicle's make, model year, series,* and other distinguishing characteristics.

The very specific vehicle types for which results are presented in this report were derived from the VINs of the individual automobiles.

Only data with valid VINs were used for this report. Each VIN was decoded into a set of specific characteristics. For the purposes of this report the vehicle characteristics of primary concern were make, model year, series, body style, and wheelbase.

Exposure

Exposure, in terms of insured vehicle years, was computed for each individual vehicle from the coverage data. The total number of insured vehicle years for each vehicle series was then obtained by accumulating the exposure for all of the individual vehicles of that vehicle series.

For each vehicle series, the exposure was also computed for each operator age group -- youthful operators and no youthful operators.*

Claim Frequency

Both pending and paid claims for an individual vehicle were first matched with the vehicle's corresponding coverage data to ensure that the crash had occurred within an appropriate period of coverage for that vehicle. In every instance in which multiple claims were made for the same crash -- e.g., when more than one occupant of the car incurred medical expenses -- the claims were treated as a single injury claim in the calculation of claim frequencies. It should be noted that some medical expenses can sometimes be incurred even though the occupants are not injured. This can occur, for example, when precautionary medical examinations are undertaken even though no injuries are apparent or, in fact, found.

All injury claims involving medical expense reimbursements were used, together with the corresponding exposure, to compute the claim frequencies in terms of the number of claims per 1,000 insured vehicle years. The overall claim frequency results were computed using both paid and pending claims. In addition to the overall claim frequency results, separate claim frequency results were computed for claims in which the medical losses exceeded $250, $500, and $1,000. The latter three results provide indications of the extent to which particular cars are over- or under-involved in crashes resulting in more

* See Appendix C for definitions.

significant injuries. Claims involving nonmedical losses only and claims settled without payments were not used. Thus, the claim frequencies represent the number of crashes per 1,000 insured vehicle years in which one or more injuries occurred resulting in medical expense claim payments under PIP insurance coverages.

Standardization

The losses for different vehicles can vary substantially in relation to certain nonvehicle factors. One important factor with which claim frequency varies is the operator age group, and the mix of operator ages can vary considerably among different vehicle types -- so considerably that it could distort comparisons of results between vehicles if not taken into account.

Youthful operators have higher insurance claim frequencies than older drivers. Thus, if two vehicle types have different proportions of youthful operators, this difference, if not taken into consideration, would be sufficient to bias comparisons. To remove this effect, the results for each vehicle type were weighted, using the values shown below, to produce a weighted average of the actual results for each operator age group. In this way the results for each vehicle type are based on the same mix, or distribution, of exposure for the two operator age groups.

Because the same weights are used for each vehicle type, the effects due to operator age group are present in equal amounts in the standardized results for each vehicle type. Therefore, to the extent that the age distributions within operator age group do not vary substantially for different vehicles, these effects can no longer bias comparisons among vehicles.

This standardization procedure is widely used in vital health statistics.* The basic principle of this standardization procedure is the introduction of a standard distribution of exposure for the different operator age groups.

OPERATOR AGE GROUP WEIGHTS

Youthful Operator	No Youthful Operator	Combined
0.1	0.9	1.0

*For example, see Armitage, P., *Statistical Methods in Medical Research*, Wiley, New York, 1971.

Mathematical Procedures

This section describes, and illustrates with an example, the mathematical calculations performed in applying the standardization procedure to the injury loss information used for this report.

For a particular vehicle series (or group of vehicles), let C_i represent the total number of claims (paid and unpaid) and let E_i represent the total number of insured vehicle years of exposure, where

i = y means that the classification code assigned to the vehicle indicates youthful operator, and

i = n means that the classification code assigned to the vehicle indicates no youthful operator.

Thus, youthful and no youthful operator claim frequencies (f_y and f_n, respectively), in terms of the number of claims per 1,000 insured vehicle years, are calculated as

$$f_y = (C_y / E_y) \times 1{,}000, \text{ and } f_n = (C_n / E_n) \times 1{,}000 .$$

The above claim frequencies are then combined using the previously cited operator age group weights to obtain the standardized claim frequency (f) as follows:

$$f = (0.1)f_y + (0.9)f_n.$$

Example: 1988 Ford Mustang

Number of Claims by Operator Age Groups		Exposure By Operator Age Groups	
Youthful	No Youthful	Youthful	No Youthful
$C_y = 249$	$C_n = 421$	$E_y = 6{,}248.09$	$E_n = 14{,}285.55$

Thus, the youthful and no youthful operator claim frequencies are:

$$f_y = (249 / 6{,}248.09) \times 1{,}000 = 39.85,$$

and

$$f_n = (421 / 14{,}285.55) \times 1{,}000 = 29.47.$$

The standardized claim frequency is calculated as follows:

$$f = (0.1)f_y + (0.9)f_n = (0.1)(39.9) + (0.9)(29.5) = 30.54 .$$

Thus, the standardized claim frequency for the 1988 Ford Mustang is 30.5 claims per 1,000 insured vehicle years of exposure.

Exposure Threshold For Reporting Results

A threshold of 5,000 insured vehicle years of exposure was selected for reporting the overall claim frequency results for vehicle groups and individual vehicle series. Consequently, no results are presented in this report for any of the vehicle series with smaller amounts of exposure. In addition, different thresholds were used to determine whether the claim frequency results for medical losses exceeding the specified dollar amounts were published. In order for the claim frequency results for medical losses exceeding $250 to be published, at least 10,000 insured years of exposure were required; for medical losses of greater than $500, the minimum exposure was 15,000; and for medical losses exceeding $1,000, the minimum exposure was 25,000 insured vehicle years.

It should be kept in mind that, in general, the greater the exposure associated with a reported claim frequency, the more confidence can be placed in it.

Combining Results for More Than One Model Year

The relative injury loss experience of particular vehicles does not change substantially from model year to model year providing that the basic design of the vehicle remains essentially unchanged. For this reason and because substantial amounts of exposure are needed to provide reliable injury claim frequency results, the data for model years 1986 through 1988 were combined for those vehicles with unchanged basic designs.

The aggregated model year result (R) for each vehicle series (i) was obtained by weighting the relative claim frequency for each model year (j) by the applicable exposure for each model year; that is,

$$R_i = [\Sigma (exp_{ij} (f_{ij} / F_j)) / (\Sigma exp_{ij})] \times 100,$$

where

exp_{ij} = exposure for vehicle i for model year j,

f_{ij} = standardized claim frequency for vehicle i for model year j, and

F_j = standardized claim frequency for all passenger cars for model year j.

Example: Ford Mustang

	1988	1987	1986
Exposure (exp)	20,534	39,277	85,986
Claim Frequency (f)	30.5	24.8	25.8
Claim Frequency (F) -- all	21.3	20.3	19.5

Result = [20,534 (30.5 / 21.3) + 39,277 (24.8 / 20.3) + 85,986 (25.8 / 19.5)] / [20,534 + 39,277 + 85,986] x 100 = 131.

APPENDIX C
Definitions

Claim Frequency -- The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per one thousand insured vehicle years.

Exposure -- The time interval an individual vehicle is insured. Exposure for a group of vehicles is expressed in units of insured vehicle years.

First-Party Coverage -- An insurance coverage under which the policyholder collects compensation for his losses from his own insurer regardless of fault.

No-Fault Auto Insurance -- An auto insurance plan in which each driver/owner accepts financial responsibility for some or all losses sustained by himself, pedestrians hit by him, and occupants of his own vehicle in return for which he enjoys some immunity from liability for losses to third-party persons.

Operator Age Group -- The factor that distinguishes those vehicles with a youthful rated driver from those vehicles without a youthful rated driver (see Youthful Operator).

Personal Injury Protection (PIP) Coverage -- First-party no-fault coverage in which an insurer pays, within the specified limits, the medical, hospital, and other expenses of the insured, others in his vehicle, and pedestrians struck by him.

Rated Driver -- The driver who, for insurance purposes, is considered to represent the greatest loss potential for the insured vehicles.

Vehicle Classifications -- There are four vehicle classes, defined as follows:

1. **Passenger Cars** -- There are four major body style groupings of passengers cars - regular two-door models, regular four-door models, station wagons and passenger vans, and sports and specialty models. Sports and specialty models include all two- seater cars, all convertibles, all midsize and large cars with two or fewer designated rear seating positions, and all luxury cars. Each body style group is further divided into classes based on wheelbase size (rounded to the nearest inch) defined as follows:

   Small -- Cars with wheelbases less than or equal to 99 inches.
   Midsize -- Cars with wheelbases greater than 99 inches and less than or equal to 109 inches.
   Large -- Vehicles with wheelbases greater than 109 inches.

2. **Vans** -- Fully enclosed vehicles with either no hood or a very short hood, in which the engine is placed at least 50 percent behind the windshield. The driver's position is usually well forward, nearly beside the engine, usually within the forward 25 percent of the wheelbase. These vehicles are designed for cargo transport and are equipped with a right-side cargo access door and rear doors. The cargo area is not separated from the passenger area - both are enclosed under the same roof.

3. **Pickups** -- Cargo-carrying vehicles, usually on a truck chassis, with an enclosed cab and a separate open cargo area. The open cargo area generally is a box with raised sides with an opening tailgate. There are also a small number of auto pickups that are similar to regular pickups except that they are built on a passenger car chassis. Pickups are further divided into two subgroups based on curb weight - small pickups (less than 3,500 pounds) and standard pickups (3,500 pounds or more).

4. **Utility Vehicles** -- Vehicles built on a heavy-duty chassis capable of off-road use. They are of conventional construction with the driver behind the engine. The cargo and passenger areas are integral with the driver area. Many of these vehicles are equipped with soft or removable tops. Frequently, these vehicles are equipped with four-wheel drive. Utility vehicles are further divided into three subgroups based on wheel-base size - small utility vehicles (less than 100 inches), intermediate utility vehicles (from 100 to 120 inches), and large utility vehicles (greater than 120 inches).

Vehicle Identification Number (VIN) -- A code, variously comprising both numbers and letters; normally 8 to 17 characters in length, assigned to each vehicle by its manufacturer. The VIN uniquely identifies the vehicle within at least a 10-year time span and, in recent model year vehicles, almost always contains coding that identifies the make, series, model year, and other characteristics of each vehicle.

Vehicle Series -- A name denoting a family of vehicles, within a make, with the same wheelbase and a degree of commonality in construction such as body, chassis, etc.

Youthful Operator -- For the purposes of this report, all males (married or single) under 25 years of age and all unmarried females under 25 years of age.

APPENDIX D
Vehicle Series Designations
Part A: Passenger Cars

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Acura	Integra	S	S		
	Legend** - 2 Dr.				M
	Legend - 4 Dr.				M
Alfa Romeo	Milano**		S		
	Spider Convertible				S
American	Eagle			M	
Aston Martin	Lagonda				L
	Saloon				M
	Vantage				M
	Volante				M
Audi	80*		M		
	80 Quattro 4WD* - 4 Dr.				M
	90* - 4 Dr.				M
	90 Quattro 4WD* - 4 Dr.				M
	5000 - 4 Dr. & S.W.				M
	5000 Quattro - 4 Dr. & S.W.				M
Austin Rover	Sterling 825**				M
Avanti	Avanti II				M
	Avanti Convertible**				M
Bentley	Continental Convertible**				L
	Eight**				L
	Mulsanne				L
Bertone	X 1/9				S
BMW	M3* - 2 Dr.				M
	M5* - 4 Dr.				M
	M6**				M
	300 Series - 2 Dr.				M
	300 Series - 4 Dr.				M
	325i Convertible**				M
	325iX* - 2 Dr. 4WD				M
	325iX* - 4 Dr. 4WD				M
	500 Series				M
	635CSi/L6				M
	700 Series				L

Passenger Cars (Cont'd)

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Buick	Century	M	M	M	
	Electra FWD	L	L		
	Electra RWD			L	
	LeSabre	L	L	L	
	Regatta*				S
	Regal FWD*	M			
	Riviera				M
	Skyhawk	M	M	M	
	Skylark/Somerset	M	M		
Cadillac	Allante Convertible**				S
	Brougham				L
	Cimarron		M		
	DeVille - 2 Dr. & 4 Dr.				L
	Eldorado				M
	Fleetwood/Fleetwood d'Elegance				L
	Fleetwood Sixty Special**				L
	Seville				M
Chevrolet	Astro Van			L	
	Beretta**	M			
	Camaro				M
	Camaro Convertible**				M
	Caprice	L	L	L	
	Cavalier	M	M	M	
	Cavalier Convertible				M
	Celebrity	M	M	M	
	Corsica**		M		
	Corvette				S
	Corvette Convertible				S
	Monte Carlo	M			
	Nova		S		
	Spectrum	S	S		
	Sprint	S	S		
Chrysler	Daytona**	S			
	Dynasty*		M		
	LeBaron	M**	M	M	
	LeBaron Convertible**				M
	LeBaron GTS		M		
	New Yorker		M		
	New Yorker (C Body)*		M		
	New Yorker 5th Avenue		L		
	Newport		L		
Chrysler/ Plymouth/ Mitsubishi	Colt	S	S	S*	
	Colt Vista			M	
	Colt Vista 4WD			M	
	Conquest	S			
Daihatsu	Charade*	S			

Passenger Cars (Cont'd)

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Dodge	Aries	M	M	M	
	Caravan			L	
	Daytona	S			
	Diplomat		L		
	Dynasty*		M		
	Lancer		M		
	Omni		S		
	Shadow**	S	S		
	600		M		
Dodge/ Mitsubishi	Colt	S	S	S*	
	Colt Vista			M	
	Colt Vista 4WD			M	
Ferrari	Mondial Convertible				M
	Mondial				M
	Testarossa				M
	328				S
	328 Convertible				S
Ford	Aerostar			L	
	Crown Victoria	L	L	L	
	Escort	S	S	S	
	EXP				S
	Festiva*	S			
	Mustang				M
	Mustang Convertible				M
	Taurus		M	M	
	Tempo	M	M		
	Tempo 4WD**	M	M		
	Thunderbird	M			
GMC	Safari Van			L	
Honda	Accord	M	M		
	Civic*	S	S	S	
	Civic CRX*				S
	Civic 4WD*			S	
	Prelude*	S			
Hyundai	Excel	S	S		
Isuzu	Impulse	S			
	I-Mark	S	S		
Jaguar	XJ-S				M
	XJ-SC				M
	XJ6				L

Passenger Cars (Cont'd)

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Lincoln	Continental*				M
	Mark VII				M
	Town Car				L
Lotus	Esprit Turbo				S
Maserati	Biturbo				S
	Spyder Convertible				S
	425				M
Mazda	MX-6*	S			
	RX-7				S
	RX-7 Convertible*				S
	323	S	S	S**	
	323 4WD*	S			
	626*		S		
	929*		M		
Mercedes-Benz	190D/E				M
	260E/300D/E				L
	SDL/SEL Series				L
	300TD/300TE** - S.W.				L
	380/560SL Convertible				S
	560 SEC				L
Mercury	Cougar	M			
	Grand Marquis	L	L	L	
	Sable		M	M	
	Topaz	M	M		
	Tracer**	S	S		
Merkur	XR4Ti	M			
	Scorpio**				M
Mitsubishi	Cordia	S			
	Galant/Sigma		M		
	Mirage	S	S**		
	Starion	S			
	Tredia		S		
	Wagon**			S	
Nissan	Maxima		M	M	
	Pulsar**	S			
	Sentra**	S	S	S	
	Sentra 4WD**			S	
	Stanza		M**	S	
	Stanza 4WD			S	
	Van**			S	
	200 SX	S			
	300 ZX				S
	300 ZX 2+2				S

Passenger Cars (Cont'd)

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Oldsmobile	Calais	M	M		
	Custom Cruiser			L	
	Cutlass	M			
	Cutlass FWD*	M			
	Cutlass Ciera	M	M	M	
	Delta 88	L	L		
	Firenza	M	M	M	
	Ninety-Eight	L	L		
	Toronado				M
Peugeot	505		M	L	
Plymouth	Caravelle		M		
	Gran Fury		L		
	Horizon		S		
	Reliant	M	M	M	
	Sundance**	S	S		
	Voyager			L	
Pontiac	Bonneville		L**		
	Fiero				S
	Firebird				M
	Firefly	S			
	Grand Am	M	M		
	Grand Prix*	M			
	Parisienne			L	
	Sunbird	M	M	M	
	Sunbird Convertible				M
	6000	M	M	M	
Porsche	911 Coupe				S
	911 Targa/Cabriolet				S
	924 Coupe				S
	928 Coupe				S
	944 Coupe				S
Renault/Eagle	Medallion*		M	M	
	Premier*		M		
Rolls Royce	Corniche Convertible				L
	Silver Spirit				L
	Silver Spur				L
Saab	900	S	S		
	900 Convertible				S
	9000				M
Subaru	DL/GL	S	S	S	
	DL/GL 4WD			S	
	GL 4WD	S	S		
	Hatchback	S			
	Hatchback 4WD	S			
	Justy**	S			

Passenger Cars (Cont'd)

Make	Series	2-Door Model	4-Door Model	S.W./ Pass.Van	Sports/ Specialty
Subaru (cont'd)	Justy 4WD*	S			
	XT Coupe	S			
	XT Coupe DL				S
	XT Coupe 4WD	S			
Toyota	Camry**		M	M	
	Camry 4WD*		M		
	Celica	S			
	Celica 4WD*	S			
	Celica Convertible**				S
	Corolla	S	S		
	Corolla FX**	S			
	Cressida		M	M	
	MR2				S
	Supra				M
	Tercel	S**	S**	S	
	Tercel 4WD			S	
	Van			S	
	Van 4WD**			S	
TVR	280i				S
	280i Convertible				S
Volkswagen	Cabriolet				S
	Fox**	S	S	S	
	Golf	S	S		
	GTI	S			
	Jetta	S	S		
	Quantum		M	M	
	Quantum 4WD			M	
	Scirocco	S			
	Vanagon			S	
Volvo	240		M	M	
	740/760 4 Dr. & S.W.				M
	780**				M
Yugo	Yugo	S			

S – Small
M – Midsize
L – Large

* 1988 Models Only
** 1987 and 1988 Models Only

APPENDIX D
Vehicle Series Designations
Part B: Vans, Pickups, And Utility Vehicles

Vehicle Class	Make	Series
Vans	Chevrolet	Astro Cargo Van Chevyvan (1/2T) Chevyvan (3/4T) Sportvan (1/2T) Sportvan (3/4T)
	Dodge	B150 (1/2T) B150 Cargo Van B250 (3/4T) B250 Cargo Van Mini Ram/Royal
	Ford	Aerostar Cargo Van E-150 Club Wagon (1/2-3/4T) E-150 Econoline (1/2-3/4T) E-250 Club Wagon (3/4T) E-250 Econoline (3/4T)
	GMC	Rally Wagon (1/2T) Rally Wagon (3/4T) Safari Cargo Van Vandura (1/2T) Vandura (3/4T)
	Mitsubishi	Cargo Van**
	Toyota	Cargo Van Cargo Van 4 x 4**
	Volkswagen	Vanagon Camper
Pickups	Chevrolet	Crew Cab (3/4T) S10 S10 4 x 4 S10 Extended Cab** S10 Extended Cab 4 x 4** 10 Series (1/2T)* 10 Series (1/2T) 4 x 4* 20 Series (3/4T)* 20 Series (3/4T) 4 x 4*
	Dodge	Dakota (1/2T)** Dakota (1/2T) 4 x 4** D150 (1/2T) D250 (3/4T)

Vans, Pickups, And Utility Vehicles (Cont'd)

Vehicle Class	Make	Series
Pickups	Dodge (cont'd)	Ram 50**
		Ram 50 Long Bed**
		Ram 50 4 x 4**
		Ram 50 Long Bed 4 x 4**
		W150 (1/2T) 4 x 4
		W250 (3/4T) 4 x 4
	Ford	F-150 (1/2-3/4T)
		F-150 (1/2-3/4T) 4 x 4
		F-150 Super Cab
		F-150 Super Cab 4 x 4
		F-250 (3/4T)
		F-250 (3/4T) 4 x 4
		F-250 Super Cab
		F-250 Super Cab 4 x 4
		Ranger
		Ranger 4 x 4
		Ranger Super Cab
		Ranger Super Cab 4 x 4
	GMC	S15
		S15 4 x 4
		S15 Extended Cab**
		S15 Extended Cab 4 x 4**
		1500 Series (1/2T)*
		1500 Series (1/2T) 4 x 4*
		2500 Crew Cab (3/4T)
		2500 Series (3/4T)*
		2500 Series (3/4T) 4 x 4*
	Isuzu	Long Bed*
		Long Bed 4 x 4*
		Long Cab*
		Long Cab 4 x 4*
		Standard Bed
		Standard Bed 4 x 4
	Jeep/AMC	Comanche**
		Comanche 4 x 4**
		Comanche Long Bed
		Comanche Long Bed 4 x 4
		J10 Long Bed (1/2T)
		J20 Long Bed (3/4T)
	Mazda	B Series Cab Plus 4 x 4**
		B Series Long 4 x 4**
		B Series Standard 4 x 4**
		B Series Cab Plus
		B Series Long Bed
		B Series Standard Bed
	Mitsubishi	Long Bed**
		Long Bed 4 x 4**
		Standard Bed**

Vans, Pickups, And Utility Vehicles (Cont'd)

Vehicle Class	Make	Series
Pickups	Mitsubishi (cont"t)	Standard Bed 4 x 4**
		Extended Cab*
		Extended Cab 4 x 4*
	Nissan	King Cab
		King Cab 4 x 4
		Long Bed
		Long Bed 4 x 4
		Standard Bed
		Standard Bed 4 x 4
	Toyota	Long Bed (1/2T)
		Long Bed (1/2T) 4 x 4
		Standard Bed
		Standard Bed 4 x 4
		Xtra Cab
		Xtra Cab 4 x 4
		Xtra Cab Long Bed
		4Runner
Utility Vehicles	Chevrolet	K10 Blazer (1/2T) 4x4
		Suburban (1/2T)
		Suburban (1/2T) 4 x 4
		Suburban (3/4T)
		Suburban (3/4T) 4 x 4
		S10 Blazer
		S10 Blazer 4 x 4
	Dodge	AD150 Ramcharger
		AW150 Ramcharger 4 x 4
	Dodge/Mitsubishi	Raider**
	Ford	Bronco 4x4
		Bronco II
		Bronco II 4x4
	GMC	Jimmy (1/2T)
		Suburban (1/2T)
		Suburban (1/2T) 4 x 4
		Suburban (3/4T)
		Suburban (3/4T) 4 x 4
		S15 Jimmy
		S15 Jimmy 4 x 4
	Isuzu	Trooper II 4 x 4
	Jeep/AMC	Cherokee
		Cherokee 4 x 4
		Grand Wagoneer
		Wagoneer
		Wrangler**

Vans, Pickups, And Utility Vehicles (Cont'd)

Vehicle Class	Make	Series
Utility Vehicles (cont'd)	Mitsubishi	Montero
	Nissan	Pathfinder**
	Range Rover	Range Rover**
	Suzuki	Samurai Samurai Van
	Toyota	Land Cruiser 4Runner Wagon

* 1988 Models Only
** 1987 and 1988 Models Only

Selected Publications

R88-2 *Insurance Collision Report, Passenger Cars, Vans, Pickups, and Utility Vehicles, 1988 Models During Their First Year, 1987 Models During their First Two years, 1986 Models During Their First Three Years,* December 1988.

R89-1 *Insurance Collision Report, Intitial Results for 1989 Automibles,* August 1989.

I87-1 *Insurance Injury Report, Passenger Cars, Vans, Pickups, and Utility Vehicles; 1985-1987 Models,* September 1988.

T88-1 *Insurance Theft Report; Passenger Cars, Vans, Pickups, and Utility Vehicles: 1988 Models During Their First Year, 1987 Models During Their First Two Years, 1986 Models During Their First Three Years,* May 1989.

A-5 *Autombile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Body Style, 1974 and 1975 Models,* December 1975.

A-7 *Automobile Insurance Losses, Collision Coverages; Annual Increases and Seasonal Variations 1972, 1973, 1974 and 1975 Models,* June 1976.

A-9 *Automobile Insurance Losses, Collision Coverage; A Comparison of Collision Claim Size Distributions for 1974-76 Models,* November 1977.

A-11 *Automobile Insurance Losses, Collision Coverage; The Consistency of the Loss Experience of Specific Vehicles Produced in Several Years, 1975 to 1978 Models,* June 1979.

A-12 *Automobile Insurance Losses, Collision Coverage; An Assessment of the Effects of the Federal Safety Bumper Standard on the Losses for 1972 Through 1978 Models,* June 1980.

A-13 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverage; The Effects of Car Size on Crash Losses, 1977-1980 Models,* May 1981.

A-14 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverage; Comparisons of the Loss Experience of Two- and Four-Door Cars, 1978, 1979, and 1980 Models,* May 1981.

A-16 *Automobile Insurance Losses, Collision Coverages; The Frequency of Claims Involving Salvage; Subcompact and Compact Cars; 1980 Models,* January 1982.

A-17 *Insurance Losses, Comprehensive Coverage; Non-Crash Fire Losses; 1979-1980 Models,* February 1982.

A-18 *Insurance Losses, Theft Coverage; The Distribution of Theft Loss Payment Amounts; Passenger Cars, Vans, Pickups, and Utility Vehicles; 1981 Models During Their First Year, 1980 Models During Their First Two Years, 1979 Models During Their First Three Years,* June 1982.

A-19 *Insurance Losses, Theft Coverages; A Comparison of the Theft Loss Experience of General Motors Passenger Cars With and Without Factory-Installed Theft Deterrent Systems; 1980-1981 Models,* January 1983.

A-20 *Insurance Losses, Collision Coverages, A Comparison of the Collision Loss Experience of Subaru Models with 5 and 2.5 MPH Bumpers,* April 1983.

A-21 *Insurance Losses, Personal Injury Protection Coverages, Injury Claim Frequencies for Volkswagen Rabbits with Automatic and Manual Seat Belts, 1981, and 1982 Models,* April 1984.

A-22 *Insurance Losses, Collision Coverages, An Analysis of Salvage Credits, 1977 Through 1982 Model Year Cars,* July 1984.

A-23 *Injury and Collision Losses by Engine Option, Selected 1983 Models,* October 1985.

A-24 *Comparison of the Insurance Loss Experience of Unibody and Frame Construction Cars After a Collision Repair, 1981-82 Models,* October 1985.

A-25 *Relationships Between Losses and Vehicle Density, 1982-84 Models,* October 1985.

A-26 *Consistency of Model Year Injury Claim Frequency Results for Selected 1981-1983 Models,* May 1986.

A-27 *A Preliminary Evaluation of New York and New Jersey Insurance Injury Claim Results Before and After Enactment of Mandatory Seat Belt Legislation; 1983-85 Models,* May 1986.

A-28 *Insurance Injury Loss Experience in Eight States with Seat Belt Laws, 1983-86 Models,* July 1988.

A-29 *Insurance Losses Based on Garaging Location, 1985-87 Models,* June 1988.

A-30 *Automobile Insurance Losses, A Comparison of California and National Results,* May 1988.